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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,335	10/01/2003	Fredrik Solhage	ANO 6277 US1/3166DIV	6520
27624	7590	12/27/2007	EXAMINER	
AKZO NOBEL INC. INTELLECTUAL PROPERTY DEPARTMENT 120 WHITE PLAINS ROAD 3RD FLOOR TARRTOWN, NY 10591			CORDRAY, DENNIS R	
			ART UNIT	PAPER NUMBER
			1791	
			MAIL DATE	DELIVERY MODE
			12/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/676,335

Applicant(s)

SOLHAGE ET AL.

Examiner

Dennis Cordray

Art Unit

1791

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4 and 6-33 is/are pending in the application.
- 4a) Of the above claim(s) 16-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,6-15 and 31-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/10/2007 has been entered.

Oath/Declaration

The oath or declaration submitted 1/12/2004 is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02. The oath or declaration is defective because:

It does not state that the person making the oath or declaration acknowledges the duty to disclose to the Office all information known to the person to be material to patentability as defined in 37 CFR 1.56.

The originally submitted Oath recites the duty to disclose to the Office all information known to the person to be material to patentability as defined in 37 CFR 1.56(a), rather than 37 CFR 1.56.

Claim Objections

Claim 12 is objected to because of the following informalities: the second period at the end of the claim should be deleted. Appropriate correction is required.

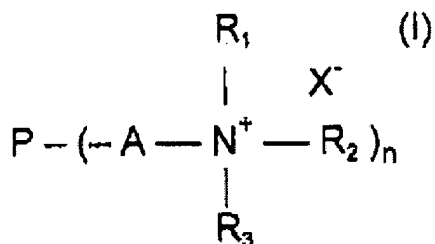
Response to Arguments

Applicant's amendments filed 10/10/2007 have overcome the rejection of Claims 1-4 and 7 under 35 U.S.C. 102(b) as being anticipated by Carr and the rejection of Claims 1-9, 11-15 and 31 under 35 U.S.C. 102 (a or e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lindgren et al. The rejections have been withdrawn.

Applicant's arguments and amendments have failed to overcome the rejection of Claims 1-10, 13-15 and 31 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as unpatentable over Persson et al.

It is noted that the claims cited in support for the amendment to Claim 1 do not recite the combination as amended, since both Claims 3 and 5 depend from Claim 1. However, the Examiner found the required support on p 7, lines 1-19 of the originally-filed Specification. It is further noted that the lines cited in support for new Claims 32 and 33 have no relation to the claimed subject matter. However, the Examiner found the required support on p 7, lines 31-34 of the originally-filed Specification.

Regarding the arguments on pp 7-9 against Persson et al, the reference teaches a cationic polysaccharide having substituents with cationic groups and/or hydrophobic groups (page 2, lines 2-5; page 3, line 26 to page 4, line 23; p 4, lines 30-32). In particular, the hydrophobic group can be selected from aromatic groups, aliphatic hydrocarbon groups (non-aromatic) and mixtures of such groups (p 3, lines 26-28). Particularly suitable polysaccharides comprise quaternary groups of the general formula (I):



where wherein P is a residue of a polysaccharide; A is a group attaching N to the polysaccharide residue, suitably a chain of atoms comprising C and H atoms, and optionally O and/or N atoms, usually an alkylene group with from 2 to 18 and suitably 2 to 8 carbon atoms, optionally interrupted or substituted by one or more heteroatoms, e.g. O or N, e.g. an alkyleneoxy group or hydroxy propylene group (-CH₂ - CH(OH) - CH₂ -); R₁ and R₂ are each H or, preferably, a hydrocarbon group, suitably alkyl, having from 1 to 3 carbon atoms, suitably 1 or 2 carbon atoms; R₃ is a hydrophobic hydrocarbon group containing at least 2 carbon atoms, suitably 4 to 14 and preferably 6 to 12 carbon atoms, the hydrophobic group suitably being as defined above, preferably a group selected from alkyl and aralkyl groups, e.g. benzyl and phenylethyl groups; n is an integer from about 2 to about 300,000, suitably from 5 to 200,000 and preferably from 6 to 125,000 or, alternatively, R₁, R₂ and R₃ together with N form a aromatic group containing from 5 to 12 carbon atoms; and X⁻ is an anionic counterion, usually a halide like chloride (p 4, lines 3-23). When R₃ is aromatic, the disclosed structure reads on claimed structural formula (I) and, when R₃ is a hydrophobic hydrocarbon group, the disclosed structure reads on claimed structural formula (II). Thus polysaccharides comprising structures corresponding to both claimed structural formulae are disclosed or, at least, one of ordinary skill in the art at the time of the invention would have readily

been able to envision embodiments of Persson et al with polysaccharides comprising both structures.

Regarding unexpected results, the examples provided in the instant Specification compare specific starches (native potato starch) quaternized with a specific compound having an aromatic group (3-chloro-2-hydroxypropyl dimethyl benzyl ammonium chloride) and a specific compound having no aromatic group (2,3-epoxypropyl trimethyl ammonium chloride) with starches having one or the other of the specific substituents but not both. The degree of substitution, ratio of aromatic-containing vs. non-aromatic-containing substituents, and the presence of an anionic material vary. An anionic material (one of two specific additives) may or may not be added. The data provided are not commensurate with the breadth of the claims and, at best, may lend some support for the use of a native potato starch quaternized with 3-chloro-2 hydroxypropyl dimethyl benzyl ammonium chloride and 2,3-epoxypropyl-trimethyl ammonium chloride over the same starch quaternized with only one of the agents.

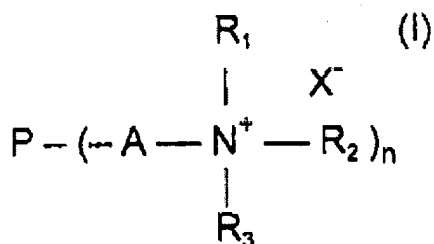
Absent sufficient support for unobvious results when using the claimed invention over that disclosed by Persson et al, it would have been obvious to one of ordinary skill in the art use a ratio of aromatic containing to non-aromatic containing substituents in the cationic polysaccharide of Persson et al within the claimed range as a functionally equivalent option.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-2,4, 6-10, 13-15 and 31-33 are rejected under 35 U.S.C. 103(a) as unpatentable over Persson et al (WO 99/55964).

Claims 1, 3-4 and 31-33: Persson et al discloses a process for producing paper from an aqueous suspension containing cellulosic fibers, and optional fillers, which comprises adding to the suspension a sizing dispersion containing a cationic polysaccharide having substituents with cationic and/or hydrophobic groups (page 2, lines 2-5; page 3, line 26 to page 4, line 23; p 4, lines 30-32). In particular, the hydrophobic group can be selected from aromatic groups, aliphatic hydrocarbon groups (non-aromatic) and mixtures of such groups (p 3, lines 26-28). Particularly suitable polysaccharides comprise quaternary groups of the general formula (I):



where wherein P is a residue of a polysaccharide; A is a group attaching N to the polysaccharide residue, suitably a chain of atoms comprising C and H atoms, and optionally O and/or N atoms, usually an alkylene group with from 2 to 18 and suitably 2 to 8 carbon atoms, optionally interrupted or substituted by one or more heteroatoms, e.g. O or N, e.g. an alkyleneoxy group or hydroxy propylene group (- CH₂ - CH(OH) - CH₂ -); R₁ and R₂ are each H or, preferably, a hydrocarbon group, suitably alkyl, having from 1 to 3 carbon atoms, suitably 1 or 2 carbon atoms; R₃ is a hydrophobic hydrocarbon group containing at least 2 carbon atoms, suitably 4 to 14 and preferably 6

to 12 carbon atoms, the hydrophobic group suitably being as defined above, preferably a group selected from alkyl and aralkyl groups, e.g. benzyl and phenylethyl groups; n is an integer from about 2 to about 300,000, suitably from 5 to 200,000 and preferably from 6 to 125,000 or, alternatively, R₁, R₂ and R₃ together with N form a aromatic group containing from 5 to 12 carbon atoms; and X⁻ is an anionic counterion, usually a halide like chloride (p 4, lines 3-23). When R₃ is aromatic, the disclosed structure reads on claimed structural formula (I) and, when R₃ is a hydrophobic hydrocarbon group, the disclosed structure reads on claimed structural formula (II). Thus polysaccharides comprising structures corresponding to both claimed structural formulae are disclosed or, at least, one of ordinary skill in the art at the time of the invention would have readily been able to envision embodiments of Persson et al with polysaccharides comprising both structures.

Forming and dewatering the suspension on a wire is disclosed (page 2, lines 9-10).

Persson et al does not explicitly disclose the ratio of aromatic containing to non-aromatic containing substituents. Absent sufficient evidence of unobvious results when using the claimed invention over that disclosed by Persson et al, and having the disclosure by Persson et al of mixtures of cationic substituents, it would have been obvious to one of ordinary skill in the art use ratios of aromatic containing to non-aromatic containing substituents within the claimed range as functionally equivalent options yielding predictable results.

Claim 2: The degree of cationic substitution (DS_c) ranges from 0.01 to 5, with a preferred range of 0.025 to 0.2, corresponding to a cationic charge density of 0.03 to 6 meq/g, or a preferred range of about 0.15 to about 1.23 (calculated using a molecular weight for the polysaccharide of 162) (page 4, lines 24-29).

Claim 7: The cationic polysaccharide is preferably a starch or guar gum (page 2, lines 30-31).

Claim 6: Persson et al discloses that the polysaccharide can be cationized using cationic agents known in the art (page 4, line 34 to page 5, line 2; page 5 lines 17-24), such as those disclosed in US Patent No. 5463127 (the teachings of which were incorporated by reference), which teaches in col 1, lines 7-10 that "Halohydroxypropyltrialkylammonium halides are known to be useful as intermediates used in modification of natural and synthetic polymers, particularly in production of cationic polysaccharides, e.g. starch." Persson et al teaches in the background section that 3-chloro-2-hydroxypropyl trimethylammonium chloride is a known quaternizing agent for polysaccharides (page 1, lines 23-25), thus would have been an obvious cationizing agent to one of ordinary skill in the art, giving the claimed second substituent of Claim 6. The aromatic group can be added by a cationizing species such as N-dialkyl-N-aryl ammonium halide or N-(3-chloro-2 hydroxypropyl)-N-benzyl-N,N-dimethyl ammonium chloride (page 5, lines 2-17), which gives the first substituent of Claim 6.

Claims 8-10: Persson et al discloses that an anionic material may be added, and that the anionic material can include silica based particles and clays of the smectite type

(page 5, lines 25-33 and page 6, lines 7-8). Persson et al further discloses that the anionic material can be silica based particles with a specific surface area from 50 – 1000 m²/g and which are present in a sol having an S value of 8 - 45% (page 6, lines 31-36). The ranges for surface area and sol S value significantly overlap and thus anticipate the claimed ranges.

Claim 13: Persson et al discloses the papermaking process further comprising recirculating the white water and adding fresh water up to 30 tons of fresh water per ton of dry paper produced (page 10, lines 5-7).

Claims 14-15: Persson et al discloses adding a synthetic low molecular weight cationic polymer, which can be a polyacrylamide (page 7, lines 32-36 and page 8, lines 1-5)

Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Persson et al in view of Lindgren et al (6818100).

Persson et al does not disclose an anionic organic step-growth polymer.

Lindgren et al discloses a process for producing paper from an aqueous suspension containing cellulosic fibers, and optional fillers, which comprises adding to the suspension a sizing dispersion containing a cationic polysaccharide having substituents with an aromatic group, and an anionic step growth polymer (Abs; col 3, lines 48-60; col 4, line 33 to col 5, line 22; col 8, line 19 to col 9, line 5). The aromatic group is "suitably an aromatic hydrocarbon group, including aralkyl groups, e.g. benzyl and phenylethyl groups" (col 8, lines 56-58). The cationic polysaccharide is preferably a

starch or guar gum (col 7, lines 54-64). A second cationic polymer is added as a sizing promoter, and can be a cationic polyacrylamide (col 7, line 54 to col 8, line 5). In a preferred embodiment, an anionic polymer, which can be an organic step growth polymer that is a naphthalene sulfonate, is also added as part of the sizing promoter (col 12, lines 27-50). Other materials that can be added are anionic clays of the smectite type, anionic silica based particles, and low molecular weight organic polymers (col 14, lines 47-58).

The process comprises recirculating white water and introducing fresh water in an amount of less than 30 tonnes per tonne of dry paper produced (col 15, lines 29-42).

Lindgren et al reviews the disclosure of Persson et al as a known sizing process in the background section (col 1, lines 55-60) and discloses improvements thereover. Lindgren et al teaches that the disclosed invention improves sizing in general and specifically in aqueous suspensions containing cellulosic fibers having high conductivities (col 2, lines 7-10).

The art of Persson et al, Lindgren et al and the instant invention is analogous as pertaining to the addition of cationic polysaccharides containing both aromatic and non-aromatic substituents to a papermaking suspension. It would have been obvious to one of ordinary skill in the art to add a sizing promoter comprising the claimed anionic polymer in the process of Persson et al in view of Lindgren et al to obtain the disclosed improvement in sizing over Persson et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Cordray whose telephone number is 571-272-8244. The examiner can normally be reached on M - F, 7:30 -4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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